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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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Bertrand Lion

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EXAMINER

PEZZUTO, HELEN LEE

ART UNIT

PAPER NUMBER

1796

MAIL DATE

DELIVERY MODE

06/04/2009

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/670,478	Applicant(s) LION ET AL.	
	Examiner Helen L. Pezzuto	Art Unit 1796	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,3,4,8,18,26,27,29,35,73,75,78,81-83 and 87-89 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1, 3-4, 8, 18, 26-27, 29, 35, 73, 75, 78, 81-83, 87-89 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. ____. |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>4/20/09</u> . | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

Information Disclosure Statement

The information disclosure statement (IDS) submitted on 4/20/09 has been considered by the examiner, with the exception of those without publication dates.

Response to Amendment

Applicant's amendment to claim 1, and the cancellation of claim 79 filed in the response on 3/23/09 is acknowledged. Currently, claims 1, 3-4, 8, 18, 26-27, 29, 35, 73, 75, 78, and 81-89 are pending in this application.

In light of applicant's amendment and remarks filed on 3/23/09, Galleguillos et al. (US-005) is withdrawn as an applied reference.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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2. Claims 1, 3-4, 8, 18, 26-27, 29, 35, 73, 75, 78, 81-83, and 87-89 are rejected under 35 U.S.C. 103(a) as being unpatentable over Frechet et al. (US-855 or US-925) or Schimmel et al. (US-883) or Anton et al. (US-206) in view of Graulus et al. (US-446) or Charmot et al. (US-364) or Grubbs et al. (US-666) for the reasons of record.

US 6,663,855 B2 and US 6,685,925 B2, both to Frechet et al. (reference will be made primarily with respect to the disclosure of US-855) discloses a block copolymer comprising a core polymer and two or more flanking polymers, wherein each of the core and flanking polymers can be a copolymer having one or more monomers in common, and each of the core and flanking polymers may comprise a combination of two or more monomers (col. 6, lines 29-32, 54-57) . Specifically, prior art block copolymer may have the linear structure of $(AB)_n$ -Core, wherein at least one of blocks A and B comprises two or more monomers is hydrophobic and hydrophilic. Typically, component A is a hard block having a high Tg (i.e. preferably from 30 to 150°C), and component B is a soft block having a low Tg (i.e. preferably from 175 to less than 30°C) (col. 3, line 66 to col. 4, line 36). The respective monomer components

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made up the core and flanking polymers are selected to produce a block polymer with balanced hydrophilic/hydrophobic characteristic (col. 4, lines 55-57). Prior art discloses Mn and Mw of the respective core and flanking polymers and the resultant copolymer within the claimed range (see tables at cols. 23-26). A molar ratio of the core polymer to the flanking polymer from 1:10 to 10:1 is further suggested (col. 5, lines 1-15), clearly encompassing the instant weight percent of first and second blocks. US-925 further teaches preferred embodiments of block copolymers containing up to 85 wt% of the flanking polymers (i.e. within the scope of the first block) and core polymers (i.e. within the scope of the second block)(col. 8, line 66 to col. 9, line 3). Suitable monomers for the core and flanking polymers are taught within the scope of the present claims (col. 7, line 6 to col. 9, line 49). In the embodiment of A-B-A block copolymer, prior art teaches the transition from each A block to B block maybe tapered such that there may be a gradual compositional change from A block to B block. Furthermore, there may be several monomers in a single block or there may be one or more blocks of random copolymer, referred as to the R block. Prior art discloses

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polymer architecture of A-R-B-A, A-R-B-R-A, wherein R is random blocks of monomers A and B, within the scope of the instant intermediate block. Furthermore, patentees suggest the random block may have a compositional gradient of one monomer to the other (i.e. A:B) that varies across the random block. Thus, prior art disclosure clearly suggest R contains a constituent monomer of the A and B block as presently claimed, and hence, embracing the instant intermediate block (US-855, col. 10, lines 13-50). Accordingly, the instant block copolymer comprising at least one first block, second block, linked together via an intermediate block comprising at least one constituent monomer of the at least first block and at least one constituent monomer of the at least one second block are taught within the scope of prior art block copolymer.

US 6,197,883 to Schimmel et al. discloses a coating composition comprising a block copolymer flow control agent. Prior art block copolymer contains at least a first and a second block, wherein the Tg of second block is at least 20°C greater than that of the first block. The resultant block copolymer contains at least 5 wt% to less than 95 wt% of the first and second blocks (col. 3, line 66 to col. 4, line 21). A weight ratio of the first block to

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the second block of the copolymer is taught to range from 0.05:1 to 19:1, embraces the recited weight percent of the instant first and second block (col. 4, lines 22-24). The resultant block copolymer has a number average molecular weight of from 500 to 100,000, within those expressed in claims 82-83. Suitable first and second block monomers include those derived from C₁-C₂₀ alkyl (meth)acrylates (col. 4, lines 22 to col. 6, line 10). Prior art further discloses the inclusion of a minor amount of at least one hydroxyl functional ethylenically unsaturated monomer (i.e. hydroxyalkyl (meth)acrylate) in each of the first and second blocks, in a random or gradient fashion (col. 6, lines 11-41). This hydroxy functional monomer is taught to independently occupy at one or more blocks at any position within either or both of the first and second block in a random fashion or a gradient fashion. Thus, this would allow the permutation of the recited block copolymer containing an intermediate random block, wherein the hydroxyl functional monomer randomly occupies the first and second block, as well as in the middle of the block. Prior art block copolymer is preferably produced by ATRP method wherein the instant polydispersity index of equal to or greater than 2.5 is abutted (col. 8, line 56 to col. 9,

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line 3). Thus, one having ordinary skill in the art would expect the resultant block copolymer to have identical or near identical properties.

US 6,153,206 to Anton et al. discloses a cosmetic composition comprising a synthetic polymer having a first repeating unit derived from methacrylic ester monomer having Tg of -10 to 75°C, and a second repeat unit derived from methacrylic ester monomer having Tg of 76 to 120°C. The resulting polymer can be a block copolymer having a Tg in the range of about 20 to 105°C, and a molecular weight of 5,000 to 300,000 (col. 2, lines 8-23; col. 5, lines 26-28). Patentees disclose a molecular weight of about 20,000 for the first and second repeating units (col. 3, lines 36-44; col. 4, lines 62-67), and a weight portions of the first repeating unit from 2-99 wt% and that of the second repeating unit from 1-98 wt%, and vice versa, in the copolymer (col. 5, lines 1-32). Suitable methacrylic ester monomers used as first and second repeating units fall within the scope of the first and second block monomer species expressed in the present claims (col. 3, line 56 to col. 4, line to col. 5, line 54). Prior art teaches representative architectures of block and random block

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polymers containing blocks of first and second repeating units with random blocks containing first and second repeating units dispersed between the respective blocks (col. 4, lines 28-60). Thus, encompassing the presently claimed block copolymer containing a first, second and a random intermediate block copolymer as defined in the present claims.

Prior art references discussed above provide clear disclosures regarding the method and the selection of various monomers species and their relative proportions in producing block copolymer systems having balance of hydrophilic/hydrophobic properties. The selection of varying amounts of hard and soft block components with differences in glass transition temperature, and an intermediate random block segment is suggested within the scope of the present claims. Accordingly, one skilled in the art would have readily envisaged the selection of the suitable monomers having Tg differences as taught, motivated by the reasonable expectation of success in forming block copolymers with balanced hydrophilic/hydrophobic characteristics. Once the respective monomer block components are suggested with Tg consideration, the determination of their optimum

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proportions or workable ranges taught within the general disclosures of prior art, and would involve only routine skill in the art. Some of the references discussed are silent regarding the polydispersity index expressed in the present claims, the examiner is of the position that it would have been obvious and fully within the purview of one having ordinary skill in the art to control the optimum molecular weight, polydispersity, polymer composition and architectures of the resultant block copolymer product so as to achieve optimum properties, by varying experimental parameters such as source, amount, and solvation of catalyst/initiators/control agents, polymerization temperature and time, etc., as shown in ancillary references, US 5,994,446, US 6,518,364 and US 6,410,666, which describes various processes in the production of block copolymer systems having wide range of polydispersity index. Accordingly, the instant invention as defined in the present claims, is rendered prima facie obvious in view of prior art teachings.

Response to Arguments

Applicant's arguments filed 3/23/09 have been fully considered. Applicant repeated much of the arguments of record, which have been fully addressed in previous office

actions. Applicant primarily urges that prior art references do not suggest the PDI as recited in the amended claim 1. Specifically, applicant urges that Grubbs considers a PDI of greater than 2.0 to be problem, Charmot teaches that PDI of 1.8 or greater represented poor control, and Graulus teaches that a PDI of 1.25 represents an improvement relative to PDIs of 2.25 and 5.06. The examiner respectfully disagrees. These ancillary references teach that it is obvious to a skilled artisan to use various means of experimental control to obtain polymer product having wide range of polydispersity index. The references do not expressively disclose problems associated with broader polydispersity as asserted, but merely pointed out the reasons behind the experimental observations. For example, Graulus et al. discloses broader PDI products derived from non-living polymerization processes (col. 14, lines 19-22). Charmot et al. teaches the use of control agent in living polymerization to produce products with narrower PDIs. It is well known in the polymer art that living polymerization results in products with narrower polydispersity index. It is further known that polydispersity index has an effect on the rheological, viscoelastic and other properties of polymer products.

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Accordingly, it would have been obvious to one having ordinary skill in the polymer art to produce block copolymer products having desirable properties aligned with the specific applications of the final products, by specific experimental controls in molecular weight, compositions, and polydispersity index. Regarding Schimmel et al., applicant urges that prior art discloses a PDI of less than 2.5. Firstly, the examiner is of the position that prior art is not only limited to an embodiment of less than 2.5 PDI or the use of ATRP polymerization process as asserted. Secondly, prior art's PDI of less than 2.5 abuts the instant 2.5 PDI. Thus, a prima facie case of obviousness exists in those cases where the claimed range and the prior art range, though not overlapping, but are sufficiently close that one skilled in the art would have expected them to have the same or very similar properties. Accordingly, the examiner's position is maintained.

3. THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action

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is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Helen L. Pezzuto whose telephone number is (571) 272-1108. The examiner can normally be reached on 8 AM to 4 PM, Monday thru Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Wu can be reached on (571) 272-1114. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Helen L. Pezzuto/
Primary Examiner
Art Unit 1796

hlp